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MOVABLE STAGE

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No. OF CLAIMS 7

1 This invention relates to movable stages, and relates
most specifically to a movable stage which can remain in a vertical
orientation until the stage is required and which can be lowered
at such times that it is required.

5 The movable stage of the present invention is especially
adapted for use in schools and churches, in auditoria or halls
which may also be used as gymnasias, theatres, etc. The stage may
be stored upright against a wall, and lowered only when it is
required; such as for the presentation of dramatic sketches, or
10 for an instructor or demonstrator or for any other purpose for
which stages or elevated platforms might be required. When in
its lowered position, the stage of the present invention provides
a strong, sturdy platform which is capable of supporting a number
of persons, scenery, or furniture and on which movement and
15 physical activity may occur.

One advantageous feature of the stage according to this
invention is that it may be stored when not in use in such a
manner that very little space is taken. For example, a church
hall might be designed in which a stage will be provided, but in
20 which, for reasons of economy, or other, a permanent stage is
neither required nor desired. Such a hall might be used as a
gymnasium at times, and at such times, as much floor area as is
provided in the hall will be required. These criteria may be met
with the provision of a stage according to this invention.

25 Another advantageous feature of the movable stage is
that it may be pre-assembled and installed by unskilled workmen,
thereby providing certain economies to the purchaser of the stage.

Yet another feature is that the stage may be easily
raised and lowered by one or two men, and that no complicated
30 assembly or locking or clamping is required to ensure the sturdiness



1 and rigidity of the stage when in its lowered and usable position.
Further, the invention provides a movable stage in which the sup-
porting legs are at all times perpendicular to the floor, thereby
providing ease of raising and lowering, and sturdiness when
5 lowered. In addition, the movable stage according to the present
invention requires little or no maintenance.

These and other objects and features of the present
invention will become apparent from the following description of
a preferred embodiment of the stage as illustrated by the accom-
10 panying drawings in which:

Figure 1 illustrates the stage in its lowered position;

Figure 2 illustrates the stage in its raised or storage
position;

Figure 3 is a side view of the stage in its lowered
15 position;

Figure 4 is a side view of the stage in an intermediate
position;

Figure 5 is a side view of the stage in its raised
position; and,

20 Figure 6 is a partial view showing the relationship
between a rear leg and the guide means.

Turning now to the drawings, movable stage 10 is illus-
trated in its lowered position in Figure 1, and in its raised
position in Figure 2. The stage consists of a platform 12 and
25 several rows of legs beneath the platform 12. Each leg 14 in the
front row has a caster 16 at its lower end, the purpose of which
will become evident hereafter. The remaining legs 18, in the
intermediate row (or rows) and legs 20 in the rear row have no
caster situated at the lower ends thereof, but may conveniently
30 have rubber feet or other protective means to keep them from

1 Damaging the floor. Two guides 22, such as tracks, are attached
to the wall behind the stage 10 and are situated near the outer
edges of the stage; their exact location is related to the positions
of outer columns of legs running from front to back, as is indicated
5 more clearly in Figures 4 and 6. Counter-balancing means 24 are
attached to the wall above the guides 22, and cables 26 extend
downwardly from the counter-balancing means and are attached in
any convenient manner to the stage 10.

In this case, counter-balancing means 24 are illustrated
10 as a high-lift drum of the sort used for raising and lowering
garage doors. The counter-balancing means 24 forms no part of
this invention and may conveniently be such other means as pulleys
over which run weights or sand bags. The only requirement of the
counter-balancing means is that the upward lift supplied by that
15 means is somewhat less than the total weight to be lifted upwards
when the stage is raised to its storage position as illustrated
in Figure 2. This ensures that when the stage is in its lowered
position, it will not tend to rise due to the counter-balancing
means, but when it is desired to be raised, a minimum effort will
20 be required. Additionally, cables 26 are attached to stage 10 in
such a manner that no bending stress is applied to platform 12
when the stage is being raised or lowered.

Arrow 28 in Figures 2 and 5 illustrates the direction
in which the stage moves as it is raised to its storage position.
25 It will be evident from Figure 5 that when the stage is in its
storage position, it extends only a short distance from the wall,
thereby freeing, for other uses, nearly all of the floor space
otherwise taken by the stage when in its lowered position.

Figures 3, 4, and 5 illustrate the stage in its lowered,
30 intermediate, and raised positions, respectively, and illustrate

the action of the legs as the stage is raised and lowered. Each of the legs is pivotally mounted at 30 beneath platform 12, and the legs are arranged in columns from front to back of the stage. Stringers 32 serve to support platform 12 from beneath and increase its rigidity. Arms 34 are attached to each of the outside rear legs 20 in such a manner that runners 36 are held by arms 34 within guides 22. In the embodiment shown, runners 36 comprise wheels held on axles 38 and retained by pin means 40; but the runners which move within the guides may conveniently be replaced with other slip or shoe devices provided only that whatever runner means is chosen, that it moves freely within guides 22. Notches 42 are provided at the rear edge of platform 12 to accommodate guides 22. The mounting of each of the legs at 30 may conveniently be by attaching them to axles running in rows from side to side.

Linkage arms 44 provide linkage means between each adjacent pair of legs in each column of legs running from front to back; they are supported at 46 on lower arm 34 of the outside rear legs 20, and are supported at 48 on sleeves 50 on each of the remaining legs. Support points 46 and 48 are pivots so that the arms 44 may pivot about 46 and 48 when the stage is raised or lowered. This is especially clear on an examination of Figures 3 and 4, wherein arms 44 are parallel to the floor in Figure 3, but at an angle to the floor in Figure 4 as the stage is in an intermediate position.

It will be noted from Figures 3 and 4 that legs 14, 18, and 20 remain perpendicular to the floor as the stage is raised or lowered. This may be explained as follows: A parallelogram is constituted from the various pivotal support points on the legs; for example, point 46, points 30 on legs 20 and 18 respectively, and point 48 on leg 18 as illustrated in Figures 3 and 4. In that

1 example, the distance from 46 to the wall remains constant, no
 matter what position the stage is in, i.e. raised, intermediate,
 or lowered. Since the distance from 46 to the wall is constant,
 and the angle between the wall and floor is fixed at a right angle;
 5 and since the distance between points 46 and 30, 30 and 30, 30 and
 48, and 48 and 46 are all constant, a parallelogram linkage or
 pantographic movement is set up. Further, since leg 20 is situated
 to be parallel to the wall, and therefore at right angles to the
 floor, so also are all the other legs situated to be perpendicular
 10 to the floor no matter what position the stage assumes.

 By having the legs so arranged that they are perpen-
 dicular to the floor at all times, complete freedom of movement
 of the stage is achieved. That is, when it is desired to have the
 stage moved from its raised to its lowered position, it is merely
 15 necessary to pull out at the front or sides of the platform in
 order to initiate the rolling action of caster 16 over the floor
 and the action of runner means 36 in guides 22. When the stage is
 fully lowered, the legs beneath it are in the proper position and
 the stage is immediately ready for use. Conversely, when it is
 20 required to raise the stage, a lifting action is applied to the
 rear of the platform in association with counter-balancing means
 24, and the stage moves upwards to its raised position. Once it
 is in its raised position, the legs are folded out of the way
 behind the now vertical platform, and the stage will remain in
 25 that position until it is again lowered. As mentioned above, the
 counter-balancing effect of counter-balancing means 24 is not so
 great as to completely overcome the weight of the stage so that
 the stage remains in either its raised or lowered position without
 the necessity for locking it in either position. Also, casters 16
 30 maintain contact with the floor at all times.

1 It should be noted that while runner means are provided
on both upper and lower arms 34 on the rear legs 20 which are
associated with guides 22, a single shoe might be provided which
extends along guide 22 from the upper to the lower arm 34. Further,
5 it may only be necessary, depending upon the size of the stage, to
have one guide situated in the middle of its width. Also, again
depending upon the size of the stage, it may be necessary to have
more than two guides. The number of guides, and the number of
rows and columns of legs is a function of the size of the stage.
10 However, each guide must be in operative relationship with a column
of legs as shown in Figure 6, and as described above. It will
also be noted that the stage is prevented from moving outwards
from the wall by the counter-action of runner means 36 within
guides 22.

15 While the above discussion has been related to a preferred
embodiment which has been illustrated in the drawings, it is
obvious that other modifications and alterations may be made to
the movable stage according to the present invention without depart-
ing from the spirit or scope of the appended claims.

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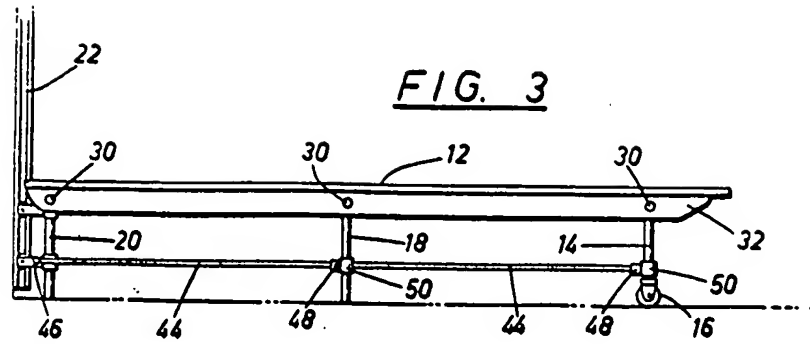
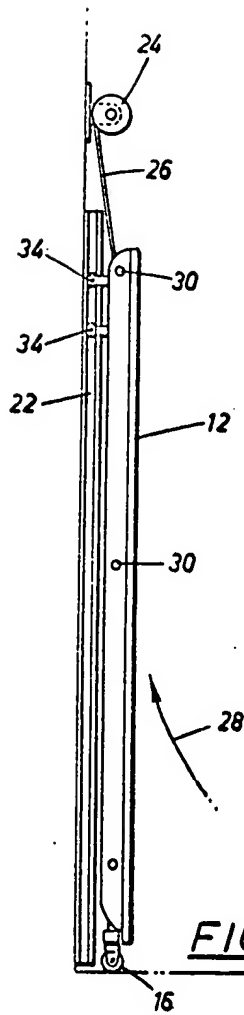
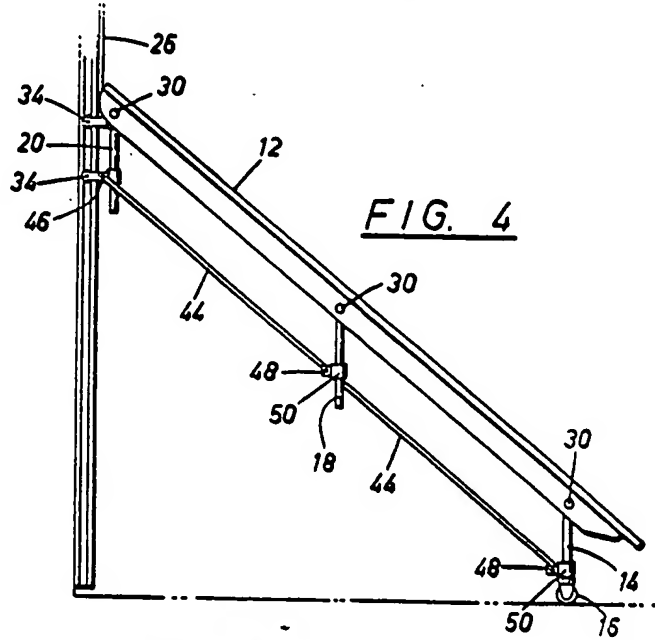
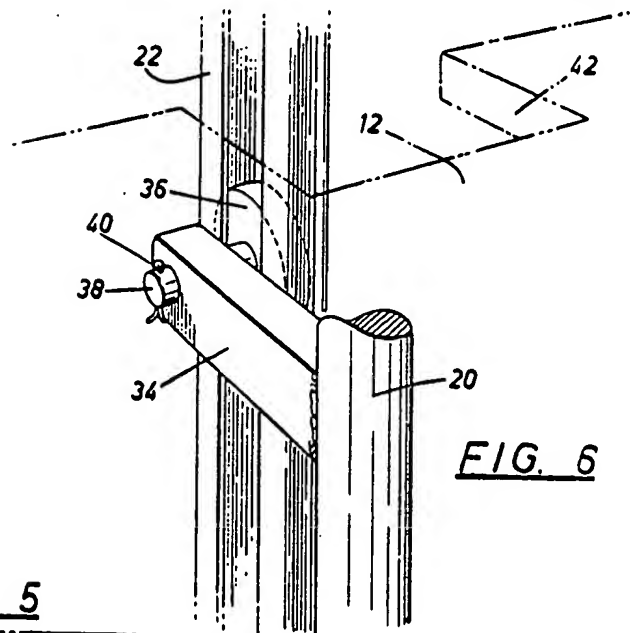
The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A movable stage comprising: a platform; a plurality of legs beneath said platform arranged in rows from side to side and columns from front to back of said platform; counter-balancing means attached to said stage and guide means at the rear of said stage in a vertical orientation; each leg of the front row of said legs provided with a caster at the lower end thereof; the rear legs in the columns closest to said guide means having upper and lower arms holding runners in said guide means; each leg of said plurality of legs being pivotally mounted beneath said platform; and a plurality of linkage arms, one between each adjacent pair of legs in said columns, each of said linkage arms pivotally attached at each end to its respective legs.
2. A movable stage according to Claim 1 wherein said counter-balancing means is chosen from the group comprising high-lift drums, weights, and sand bags.
3. A movable stage according to Claim 1 wherein said runner means are adapted to move within said guide means, and are chosen from the group comprising wheels, shoes, and slip devices.
4. A movable stage according to Claim 3 wherein said guide means comprises two tracks.
5. A movable stage according to Claim 3 wherein said guide means comprises a single track situated in the middle of said stage.
6. A movable stage according to Claim 3 wherein said guide means comprises more than two tracks spaced across the rear of said stage, each in proximity to a rear leg of one of said columns of legs.
7. A movable stage according to Claims 4, 5, or 6

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wherein the counter-balancing effect of said counter-balancing means is less than the weight of said stage.



FIG. 3FIG. 4FIG. 5FIG. 6

MOVABLE STAGE

